REMARKS

Claims 4, 10-11, 13 and 16 were rejected as being imparticular. Applicant requests reconsideration. The specification teaches that the uncured resin being a curable resins being cured after deployment of the hinge. The claims are amply supported by the specification. Anyone skilled in the art would understand that the resin is curable and is cured while on station subject to UV exposure from the sun for that purpose.

Claim 13 was specifically rejected as being imparticular. Applicant requests reconsideration. The claim was accordingly amended.

Claims 1, 13, and 16 were rejected as anticipated by Wallsten. Applicant requests reconsideration. Wallsten does not have a top film for defining the angle of deployment. There is no angle at all prescribed in Wallsten. Rather, gas pressure determines the geometries, that is, the size of the bag, and not the predetermined circumferential length of any film. Specifically, the angle, as applied to Wallsten, is always flat, at 180 degrees, as always being tangential to any radial line extending from the center of Wallsten's gas bag.

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Claims 1, 13, and 16 were rejected as being anticipated by Wallsten. Claim 3 was rejected as unpatentable over Wallsten in view of Struble. Claims 1-3 and 5-9 were rejected as being unpatentable over Simburger in view of Kaji. Claim 4 was rejected as being unpatentable over Simburger in view of Kaji in view of Struble. Claims 10-11 and 13-16 were rejected as unpatentable over 1) Simburger in view of 2) Struble in view of 3) Kaji in view of 4) Dever, (which recitation of four references is clear evidence of patententability, in and of itself). Claim 12 was rejected as unpatentable over 1) Simburger in view of 2) Kaji in view of 3) Struble in view of 4) Minahan, (which recitation of four references is clear evidence of patententability, in and of itself). Applicant requests reconsideration.

The present invention uses an inflatable hinge, that when inflated determines, the angular displacement between two movable flat panels attached to the hinge. More particularly, the present invention includes a top film having a top circumferential length, the bottom film having a bottom circumferential length, the top and bottom circumferential lengths for angularly positioning the left and right panels.

Independent Claims 1 and 13 were rejected as being anticipated by Wallsten. Wallsten teaches that an inflatable air bag can be deployed assisted by a network of internal inflatable cylinders, which are interconnected forming a frame, such that when inflated, the air bag takes on the shape of a bag, such as an automobile air bag. Wallsten teaches a network of inflatable cylinders or channels

as a frame that can be attached to the inside of an air bag to assist in deploying the air bag.

Wallsten does not teach using a flex circuit, does not teach using wrap around contacts, does not teach a left frame with adhesive, does not teach a right frame with adhesive, does not teach a coating over the right film and left film, does not teach a sublimation powder, does not teach a hinge interconnecting panel, does not teach panels, does not teach hinges, does not teach using films to define the positioning of the panels; does not teach a hinge having two panels that move independently of each other, and does not teach a coating layer to define the positioning between two panels. Wallsten teaches an air bag, which does not deploy into any form of permanent structure after deployment.

Wallsten teaches an air bag having a continuous outer periphery. The air bag has no panels whatsoever. A panel being a flat planar piece. The examiner is in error when asserting that Wallsten teaches air bag panels.

Wallsten teaches an air bag, teaches a network of inflatable channels functioning as a frame within the walls of an air bag, teaches channels disposed attached to the bag's interior walls, and teaches using a frame of channels to define the periphery inflation level of an air bag. More particularly, Wallsten uses an air bag, that when inflated, has a predetermined size. Wallsten's predetermined air bag size determines the curvature of the bag walls. The curvature is continuous about the air bag. The examiner

is in error when asserting that Wallsten's frame determines the position between two panels, which of course, do not even exist.

Wallsten teaches an air bag internally supported by a frame attached to the interior walls of the air bag. The air bag defines the periphery surface of the air bag. More particularly, Wallsten uses an air bag, that when inflated, has a predetermined size. Wallsten's predetermined air bag size determines the curvature of the bag walls. The curvature is continuous about the air bag. As the bag inflates, the bag skin forms an inflated balloon consisting of a continuous surface. As such, the continuous surface is not segmented into independently movable panels that can rotate about a hinge. The examiner is in error when asserting that Wallsten's frame is a hinge.

Wallsten teaches an air bag supported by an inflatable frame within the walls of the air bag. The size of the air bag defines the peripheral surface of the air bag. More particularly, Wallsten uses an air bag, that when inflated, has a predetermined size. The frame channels are made of a top film and a bottom film. Like the bladder of the present invention, Wallsten's frame can be inflated using a sublimation powder. As the frame inflates, the bag inflates, as the curvature of the bag walls are defined by the size of the bag. It is very clear that the dimensions of the films used to make the inflatable frame channel in no way determines the positioning of anything, let alone phantom panels, which are not shown anywhere in Wallsten, let alone by and about phantom hinges. The frames, which are not hinges, are merely attached to the

internal walls of the bag to give the bag support and aid in inflating the bag. The channels assist in inflation, and their circumferential lengths do not in anyway determine the curvature of the air bag, let alone phantom panels. It is the bag size, that is, the size and shape of the bag that determines the size and shape of the bag. The circumferential length of the channel does not determine anything, but merely provides an inflation channel. The top film and the bottom film of Wallsten's frame do not in any way define the curvature of the bag, but merely support the bag having a predetermined size that then defines the size and curvature of the bag. Hence, the channel length is used to provide support for the bag, and the bag size determines the curvature of the bag, which is continuous about the air bag without any panels. As the bag inflates, the bag skin forms a balloon consisting of a continuous surface having a radius defined by the size of the bag. As such, the continuous surface is not segmented into independently movable panels that can also rotate about a hinge. Wallsten's frame does not in any way determine the curvature of the bag, or any positions of the panels, as Wallsten's has no panels, and has no hinges. The examiner is in error when asserting that Wallsten's frame has top and bottom films that determine the positions of the non-existent panels.

Wallsten clearly uses the air bag, which is not an approximate sphere made of panels, but is a bag having a continuous surface. Wallsten does not have anticipatory panels but only walls of the air bag disposed between and under the channels of the frame. The diameter and pressure of the air bag define the positions of the

surface of the air bag. The frames do not define the positions of the walls, as hinges, which they are not, as nothing is rotating about them, which walls can flex up to 180 degrees determined by the diameter of the air bag, and not the top and bottom film layers of the frame channels. Claim 1 is not anticipated by Wallsten at least because Wallsten does not have panels and does not use top and bottom layers of the hinges, and there are no hinges, for defining the angular position of the non-existent panels. The examiner is in error when asserting that Wallsten's frame defines the positions of "left and right" panels.

Claim 13 includes the UV limitation that a coating disposed over the top film is for passing the UV light for curing the uncured resin and for static discharge protection of the film. Claim 13 was rejected as anticipated by Wallsten indicating that the resin limitation is a product by process. It is clear that the present invention uses an UV transparent coating to cure a polymer resin for rigidity from an uncured state to a cured state. Wallsten has no such function, but rather only relies upon air pressure and strong elastic properties of the material to keep the air bag inflated. Exemplar reliance upon a product by process is misplaced. The uncured resin is in an uncured state before UV on-orbit exposure and a cured state when on-orbit. The "uncured resin" indicates the state of the resin, as the device is being used and deployed, and not the making of the curing resin. The product is complete when launched having uncured resin in an uncured state. When deployed, the soft uncured resin changes its shape as well as the physical property of the resin. Nothing is being made on orbit

as the uncured resin was disposed in the device, and is part of the finished device when made. Just like a transistor being turned on and off, the resin has two states, uncured and cured, during normal use. A solar cell degrades in space over time, yet, the solar cell in this degraded state "is not being made" by anyone, and the product is defined and made prior to use. There are no laboratory assistants attached to the satellite on orbit and floating in orbit, with a little UV lamp, curing the resin, before the product is used. It is the apparatus itself that is transforming itself due to the preexisting design. The uncured resin is a resin in the uncured state before launch, and after unfurling, becomes cured by virtue of the action of the unfurling and exposure to UV light. There is no process step being claimed. This is not a product by a process, as both the uncured and cured states of the resin are contemplated during use. Wallsten does not anticipate claim 13 at least because Wallsten does not disclose the use of an uncured resin, which has two states when in use, a first uncured state and a second cured state, as is apparent from a reading of claim 1 of the present invention. The examiner is in error when suggesting that Wallsten teaches an uncured resin that is cured by UV exposure to rigidize the hinge to permanently secure panels in position. Applicant takes exception pending appeal that Wallsten neither anticipates nor in combination renders unpatentable the present invention.

Wallsten does not teach a hinge, does not teach panels, does not teach top and bottom films defining positions, does not teach top

and bottom films defining the positions of panels, does not teach encapsulated uncured resin for rigidizing a hinge, does not teach encapsulated uncured resin cured by UV light for rigidizing a hinge, does not teach encapsulated uncured resin cured by UV light for rigidizing a hinge for securing panels in position, does not teach wrap around contacts, and does not teach flex circuits. Yet, Wallsten is used incorrectly by the examiner as a primary reference for both anticipation and obviousness rejections. This is remarkable.

In connection with claim 3, sublimation powders, as in Struble, have been used for inflating inflation devices. In connection with claim 15, tin-Oxide coatings, as in Dever, have been used for anti-static discharge. In connection with claim 12, wrap around contacts, as in Minahan, have been used for interconnecting. However, the use of sublimation powders, tin-oxide coatings, and wrap around contacts are elements used as supplements to the novel combination of features of the present inventions.

Struble at least is directed to space applications. Struble teaches that a large structure can be deployed in the space environment by inflating a series of inflatable cylinders, which are tied together at the ends to form a predetermined structural shape. This is redundant to Wallsten. Struble teaches that a permanent shape can be obtained by elongation of the aluminum coating beyond its yield strength thus thereby giving the aluminum or wire braid a permanent set in space. The present invention departs using uncured resin to provide rigidity after deployment.

Struble does not teach the use of an inflatable cylindrical bladder for deploying adjacent panels to permanent positions after deployment. Struble does not teach the use of an uncured polymer resin for obtaining a permanent position in space. Struble does not teach that one could fashion a hinge where the angle of rotation can be preset by having fixed attach points around an inflatable cylinder. Struble does not teach that a structure composed of an electrical insulator needs to be protected from electrostatic discharge from exposure to the space environment. Struble's structure is coated with aluminum, which is conducting and necessary for reflecting radio waves. Thus, Struble's structure cannot use a rigidizing technology, which requires the exposure of interior layers to ultra violet light, and hence, the present invention departs from Struble's teachings.

By contradistinction, the present invention uses an inflatable bladder to rigidly position movable panels. The present invention overcomes the limitations of Struble and Wallsten when forming rigidized panels in space. The inflation gas provides the kinetic energy to move the adjacent panels from the stowed position to the permanent deployed position by virtue of the attachment of the hinge to the panels along top and bottom films having predetermined circumferential lengths. The inflated bladder has films that function for determining the final shape of the hinge and the relative positions between the two panels during the rigidization process.

Wallsten does not teach that an inflatable cylinder can be used for presetting the final position of two independent movable panels through an inflatable cylinder for determining the final shape of a hinge and relative positions of the two panels with respect to one another. Wallsten does not teach the use of an uncured resin-filled fiberglass reinforced structural element in the stowed position. Wallsten does not teach final curing of the resin-filled structural element for rigid deployment of side panels. Wallsten and Struble do not teach or suggest alone or in combination the present inventions.

Simburger does not teach a curable resin. Simburger does not teach a top film for determining the angle of deployment. The examiner admits that Simburger does not teach a top film. Hence, the examiner's references to Simburger is without merit, as Simburger, like Wallsten merely uses gas pressure to inflate where the pressure, not the circumferential length of any film, determines the angle of deployment. "During or after the extension of the struts, all of the hinges will cause unfurling rotations of the connected panels. The hinges will cause rotation of the individual respective polygonal panels from the stowed stacked position to a fixed angle position defined by adjacent flat faces of the panels to ultimately form a geodetic sphere at the end of the unfurling deployment process. The hinges would then lock at the fixed angle position to provide structural rigidity necessary to maintain the final shape of the fully deployed power sphere." "After unfurling, the exemplar top and bottom panels would respectively have top and bottom hinges and frame struts, as

particularly shown in FIG. 5C. The hinges allow for controlled deployment of the panels as an inflatable structure, but other embodiments may be used, such as spring or motor driven devices with a stop at the appropriate desired angle between juxtaposed panels. Gas canisters could also be used to inflate the hinge tubes. This gas canister inflation method is particularly useful where the geodetic curve surface forms part of a recreational tent for terrestrial applications." Simburger Reference. Simburger does not teach top film circumferential lengths for determining the angle, but rather, follows the teachings of Wallsten.

The examiner's rejection of claim 13 based upon Kaji is misguided. Kaji teaches a rod having a predetermined diameter, around which is disposed a flex circuit to form a bend in a flex material extending between two panels. The rod does not determine the angle of bend. The rod is used to form a bend with that diameter so that the flex bend is round and large conforming to the rod, so that the flex bend is too small and does not mechanically weaken the bend leading to cracks and mechanical failure of the bend. The rod in Kaji does not determine the angular bend, but only determines the radius of the bend to prevent breakage at the bend.

Struble teaches a sublimation powder in a tube for erecting a frame, but Struble does not teach inflating a hinge made of a bladder for erecting and positioning panels relative to each other as there are no panels and no hinges in Struble. Struble is merely a prior art teaching that sublimation powders can be used to inflate.

The combination of Kaji and Struble is impractical along the lines of the present invention. There is no way practical to combine Struble frames as hinges, because frames do not allow for the moving of independent panels. The combination of Kaji's rods that define a radius to prevent breakage and Struble's inflated frame does not include layers for defining the angular position of deploying and moving panels. Kaji describes a method of protecting flexible solar cell interconnects by inserting a metal rod at the point where the interconnects will be bent when folding up the solar array panels. The purpose of the metal rod is to prevent the bending radius of the interconnects from being reduced below that which the interconnects can withstand without sustaining structural damage by the act of folding up the solar array. Kaji does not use or teach that the cylindrical rod is used to set the amount of rotation of the panels to a specific predetermined angle after unfolding.

Kaji does not teach the use of an uncured epoxy resin to permanently preset at a deployed angle by curing a resin after deployment. The conductive epoxy of Kaji is the method that is used to make the connection between the interconnects and the solar array panels. The epoxy has nothing to do with the rigidizing the deployed panels in a permanent predetermined fixed position after deployment. Kaji teaches that the panels can be folded and unfolded an unspecified number of times and there is no preset deployment angle. Hence, Kaji teaches away from the use of any resin for setting the positions between two panels. Claim 13 recites that the hinge is used for permanently positioning the panels.

Because Kaji's application is a hiking backpack and not a space system, Kaji did not anticipate that there might be additional layers or coatings that must be applied to the device to allow the transmittance of ultraviolet light while protecting the device from harmful static discharge through insulating materials when bombarded by electrons which originate from the sun. Kaji teaches that one can use a cylindrical rod to prevent the bending of interconnects between solar array panels beyond the minimum bend radius of the interconnect material. Kaji does not teach that an inflatable cylinder can be used for presetting the final positions of two independent panels through the use of an inflatable cylinder used for determining the final shape of a hinge and the relative positions of the two panels with respect to one another. Kaji does not teach the use of an uncured resin-filled fiberglass reinforced structural element in the stowed position. Kaji does not teach final curing of a resin-filled structural element using the hinge as a curing mold after deployment.

The examiner's apparent tortured reasoning from a somewhat strong imagination seems to enable anyone to combine Kaji's backpack solar array, with Wallsten's automobile air bag, with Struble's large deployable radio reflector, to reject the present invention contrary to the teachings of cited references. The bag of disjointed parts rejection is prima facie evidence of nonobviousness.

Dever teaches a tin-oxide and magnesium-fluoride material for passing UV light and conducting a static charge. Dever does not

teach using a layer that can be used for a static discharge, that is also for passing UV light that functions to cure uncured resin. There is no suggestion in Kaji, Struble, or Dever to use hinge layers for defining the position, for static discharge, and for locking the panels into that position using an uncured resin cured through UV exposure.

Minahan teaches wrap around contacts for solar cells. There is no suggestion in Kaji, Struble, or Dever to use hinge layers for defining panel positions and a curing resin for locking the panels into those positions. There is no teaching in Minahan to pass electrical wires around an inflatable hinge having defined positions.

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Claim 1 claims an inflatable bladder and top and bottom films extending between panels with the top and bottom films defining the angular positioning. Claim 13 claims a top film defining the angular positioning between two panels and a curing resin cured by passing UV light through a static discharge layer. Cited references do not teach or suggest an inflatable hinge for moving panels to panel positions, do not teach or suggest an inflatable hinge having cover layers for determining the panel positions, do not teach or suggest a curing resin for locking the panels into the panel positions, and do not teach a UV static discharge layer for passing UV light to the curing resin for rigidizing the hinge for securing the panels into the panel positions. This case being in good condition, allowance of the claims is requested.

Respectfully Submitted

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